



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/634,721	08/05/2003	Ronald J. Powell	2001-IP-004326U1	8418

7590 10/11/2006

Robert A. Kent  
Halliburton Energy Services  
2600 South 2nd Street  
Duncan, OK 73536

EXAMINER

FERNANDEZ, SUSAN EMILY

ART UNIT PAPER NUMBER

1651

DATE MAILED: 10/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/634,721

Applicant(s)

POWELL ET AL.

Examiner

Susan E. Fernandez

Art Unit

1651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 62-88 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 62-88 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

The amendment filed June 22, 2006, has been received and entered.

Claims 1-61 are canceled. Claims 62-88 are new.

Claims 62-88 are pending and examined on the merits.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 62-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris et al. (WO 00/57022) in view of Harada (Methods in Carbohydrate Chemistry, 1994, Vol. X, pages 155-163) or Dummitriu (Polysaccharides in Medicinal Applications, 1996, page 41-42) or York

Art Unit: 1651

et al. (Proc. Natl. Acad. Sci. USA, 1998, 95: 4912-4917), and further in view of Parlar et al. (US 2001/0036905), Tjon-Joe-Pin et al. (US 5,247,995), and Fisk, Jr. et al. (US 5,555,937).

Harris et al. discloses a method of dissolving material within an underground reservoir wherein a treatment fluid comprising a polymer breaker is introduced into the reservoir (claim 1). The polymer breaker may be an enzyme which can hydrolyze succinoglycan (claim 14). This type of polymer breaker is used to “reduce the viscosity of polysaccharide thickened compositions or to disrupt filter cakes” (page 8, lines 11-19). Polysaccharide thickened compositions are considered to be “viscosified treatment fluid.” Thus the following can occur: (a) the viscosity of the “viscosified treatment fluid” is reduced while the filter cake is not disrupted (limitation of instant claim 62), (b) the viscosity of the “viscosified treatment fluid” is maintained while the filter cake is disrupted (limitation of instant claim 72), and (c) the viscosity of the “viscosified treatment fluid” is reduced while the filter cake is disrupted (limitation of instant claim 82). Note also that the polysaccharide thickened composition can be considered a fracturing fluid (page 1, lines 8-11). Thus, Harris et al. teaches limitations of instant claims 62, 65 (liquid), 66 (purified), 72, 75 (liquid), 76 (purified), 82, 84 (liquid), and 85 (purified).

Moreover, the reference teaches the limitations of instant claims 64, 67, 68, 71, 74, 77, 78, 81, 83, 86, and 87. See claim 29 (for instant claims 64, 68, 74, 78, 83, and 87); page 7, lines 14-18 (chelating agents such as EDTA for instant claims 67, 77, and 86); and page 7, lines 17-23 (for instant claims 71 and 81).

Harris et al. differs from the claims in that Harris et al. does not disclose that the enzyme for hydrolyzing succinoglycan is selected from the group consisting of beta-1,4 glucanases, beta-1,3 glucanases, beta-1,3;1,4 glucanases, beta-1,5 glucanases and combinations thereof.

Harada discloses a succinoglycan depolymerase for degrading succinoglycan (page 115, second paragraph and page 160, last paragraph) which degrades the (1→4)-beta-D-glucosidic linkages (Figure 1 on page 156). Thus, Harada teaches the hydrolysis of succinoglycan by a beta-1,4 glucanase. Furthermore, following degradation of succinoglycan with succinoglycan depolymerase, the resulting mixture may be further degraded by endo-(1→6)-beta-D-glucanase (page 157, "Successive Digestion of Polysaccharides with Succinoglycan Depolymerase and Endo-(1→6)-beta-D-glucanase"). Since there is no separation step following treatment of succinoglycan with succinoglycan depolymerase, the mixture obtained after the addition of endo-(1→6)-beta-D-glucanase is considered an enzyme composition comprising succinoglycan depolymerase and endo-(1→6)-beta-D-glucanase which are each capable of degrading linkages between sugar moieties of the succinoglycan. Thus, Harada also teaches the hydrolysis of succinoglycan by a beta-1,6 glucanase.

Dumitriu teaches that in one study, strain M64 of *Flavobacterium* was isolated as a strain of bacteria which uses succinoglycan as the sole carbon source. See page 41, "C. Successive Hydrolysis of Succinoglycan by Two Specific Enzymes." Researchers determined that this particular strain produces extracellular succinoglycan depolymerase and intracellular endo-(1→6)-beta-D-glucanase which hydrolyze succinoglycan (see Figure 13 on page 41).

Succinoglycan depolymerase is considered a beta-1,4 glucanase since it "hydrolyzes the beta-D-galactosyl-(1→4)-glucose linkage" (page 42, last paragraph). Moreover, the tetrasaccharides obtained from the hydrolysis of succinoglycan by the enzymes discussed above are further hydrolyzed by other intracellular enzymes in order to obtain glucose and galactose. Thus the strain M64 organism is considered an enzyme composition comprising enzymes capable of

Art Unit: 1651

degrading linkages between sugar moieties of the succinoglycan. In sum, the reference teaches the hydrolysis of succinoglycan by beta-1,4 glucanases and beta-1,6 glucanases.

York et al. teaches enzymes ExoK and ExsH which are endo-1,3-1,4-beta-glycanases (page 4912, last sentence). When these enzymes were added to *R. meliloti* cells, succinoglycan from these cells were cleaved, though it is noted that ExoK and ExsH do not efficiently cleave succinoglycan that is present in cell-free culture supernatants (page 4916, first column, last paragraph). Nevertheless, the depolymerization of succinoglycan of *R. meliloti* cells by ExoK and ExsH meets the requirements of the claims under examination. In sum, the reference teaches the hydrolysis of succinoglycan by beta-1,4 glucanases, beta-1,3 glucanases, and beta-1,3;1,4 glucanases).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have used the enzymes taught by Harada or Dumitriu or York et al. in the methods of Harris et al. since these enzymes successfully hydrolyze succinoglycan.

Additionally, it would have been obvious to have used the enzymes in various forms (solid, liquid, emulsion, mixture thereof, purified, partially purified, whole cells, whole cell lysates) since one of ordinary skill in the art would have expected that the enzymes would have remained active regardless of the form of the enzyme. Thus, all limitations recited in claims 64-66, 74-76, and 83-85 are rendered obvious by the references.

Harris et al. also differs from the claims in that it does not teach that the enzyme-containing polymer breaker further comprises glycerol, salts, bactericides, microbiocides, surfactants, or foaming agents.

Parlar et al. teaches the injection into a wellbore of breakers which are used to "...break viscosifying agents present in at least one of the filter cake or the carrier fluid" (page 4, paragraph [0039]). The breaker solution may comprise a chelating agent and hydrochloric acid (page 4, paragraph [0040]). Alternatively, a carrier fluid may be used to remove the filter cake (page 4, paragraph [0042]), wherein the carrier fluid can comprise of a chelating agent or may contain surfactants, salts, and bactericides (page 4, paragraph [0043]).

Tjon-Joe-Pin et al. teaches a method of degrading damaging material, such as filter cakes and very viscous fluid, within a subterranean formation of a well bore using an enzyme treatment (abstract). Specifically, one of the methods of Tjon-Joe-Pin et al. requires removal of a polysaccharide-containing filter cake by an enzyme treatment which attacks only specific linkages within the filter cake (claim 2). Moreover, the polysaccharide-containing filter cake is selected from the following: guar, derivatized guar, cellulose, derivatized celluloses, starches, derivatized starches, xanthans, and derivatized xanthans (claim 3). Furthermore, the enzyme treatment may comprise the following additives: surfactants, chelating agents, and foaming agents (column 8, lines 39-42).

Fisk, Jr. et al. discloses pipe release agents which act by attacking a mud filter cake in a stuck pipe (column 2, lines 18-22). An example of a pipe release agent is one based on glycerol (column 2, lines 31-33).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have included the agents disclosed in Parlar et al., Tjon-Joe-Pin et al., and Fisk, Jr. et al. in the treatment fluid disclosed by Harris et al. One of ordinary skill would have been

Art Unit: 1651

motivated to do this since these agents all assist in degrading filter cakes or viscosified treatment fluids present in a wellbore. Thus, the references render claims 67, 70, 77, 80, and 86 obvious.

Additionally, note that the references render claims 63 and 73 obvious. As discussed above, Tjon-Joe-Pin et al. discloses an enzyme treatment for degrading damaging material within a subterranean formation of a well bore wherein the enzyme treatment degrades guar, celluloses, etc., in a filter cake. It is obvious that if a treatment fluid solely comprising an enzyme that hydrolyzes succinoglycan is used, this treatment fluid would not have any effect on fluid cake which do not comprise of succinoglycan. As noted in Tjon-Joe-Pin et al., the particular enzyme used in a wellbore enzyme treatment is specific to a particular type of polysaccharide (abstract), and thus, a treatment comprising a hydrolase for succinoglycan would not have an effect on filter cakes comprising other polysaccharides with different linkages, such as those recited in instant claims 63 and 73 and discussed in the Tjon-Joe-Pin et al.

Finally, the selection of specific suitable concentrations of enzymes in the Harris treatment fluid, including those claimed, clearly would have been an obvious matter of optimization on the part of the artisan of ordinary skill, particularly since the appropriate concentration of enzyme for treatment depends on the concentration of succinoglycan present in the filter cake/"viscosified treatment fluid." Thus, claims 69, 79, and 88 are rendered obvious by the references.

Applicant's arguments filed June 22, 2006, have been fully considered but they are not persuasive. Applicant asserts that the steps recited in claims 62 and 82, pointing to page 15 of Harris et al. However, it is respectfully noted that page 8 of Harris et al. teaches one embodiment, wherein enzymes are used to reduce the viscosity of polysaccharide thickened



Art Unit: 1651

compositions or to disrupt filter cakes (page 8, lines 12-19), and this occurs at the wellbore (page 1, lines 14-16). The enzyme composition comprising the enzymes recited in claims 62, 72, and 82 is rendered obvious by Harada, Dumitriu, and York et al. Tjon-Joe-Pin is a reference provided for motivation in including other compounds in addition to enzymes for disruption of the filter cake or reduction of viscosity of the polysaccharide thickened compositions.

A holding of obviousness is clearly required.

No claims are allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

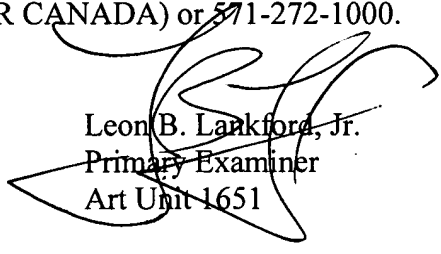
Art Unit: 1651

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan E. Fernandez whose telephone number is (571) 272-3444. The examiner can normally be reached on Mon-Fri 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Susan E. Fernandez  
Assistant Examiner  
Art Unit 1651



Leon B. Lankford, Jr.  
Primary Examiner  
Art Unit 1651

sef